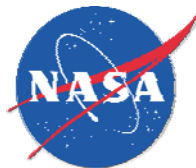


CINDAS LCC

材料金屬結構合金資料庫-操作手冊



【2009】

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出版社介紹

CINDAS LLC 設於美國普渡大學的資訊數據分析與綜合中心，出版多種材料資料庫，較早被大家知道的有材料的物理特性資料庫 Thermophysical Properties of Matter Database (TPMD) 以及電子封裝材料資料庫 Microelectronic Packaging Materials Database (MPMD)，今年 CINDAS LLC 更推出了和美國空軍共同研發出版的資料庫－航太結構金屬合金資料庫 Aerospace Structural Metals Database (ASMD)。此外，CINDAS 也是美國國防部眾多主要資訊分析中心的運轉中心，負責更新並提供重要的航太結構金屬合金手冊給美國空軍。

首頁

<https://cindasdata.com/Applications/>



Browse(瀏覽)功能

利用下拉選單瀏覽資料庫提供的材料群組及特性群組

Browse By: Material Group (Help) <input type="text"/>	Search By: Material Name <input type="text"/> <input type="button" value="Go"/> <small>e.g., ni inco, Nickel Incoloy</small>
or Property Group (Help) <input type="text"/>	or Property Name <input type="text"/> <input type="button" value="Go"/> <small>e.g., electric, Electric Resistivity</small>


- Material Group(材料群組)：選擇材料群組。
- Property Group(特性群組)：選擇特性群組。

Browse by Material Group (瀏覽材料群組)

Step.1 選擇所需的材料群組

Browse By: Material Group (Help) <input type="text" value="Nickel Chromium Steels"/>
--

Step.2 選擇材料群組後，會出現 Select Material Name 選單，幫助使用者取得精確的材料名稱

 CINDAS LLC		User Options Applications Menu Logout
CINDAS > Applications > ASMD (version 2.0, data updated 2009.1) >		
ASMD (version 2.0, data updated 2009.1)		Material Cross Index PDF PDF Help
Select Material Group:	<input type="text" value="Nickel Chromium Steels"/> <small>(20 material groups)</small>	
Select Material Name:	<input type="text"/> <small>(14 materials)</small>	
<small>© 2003-2009 CINDAS LLC</small>		

Step.3 選擇材料名稱後，會出現 Select Property (特性) and Independent Variable (獨立變異數) 選單

The screenshot shows the CINDAS LLC website interface. At the top, there is a logo and navigation links. Below the header, a breadcrumb trail reads 'CINDAS > Applications > ASMD (version 2.0, data updated 2009.1) >'. The main content area has a yellow background. It contains three dropdown menus: 'Select Material Group' (set to 'Nickel Chromium Steels'), 'Select Material Name' (set to 'Nickel Chromium Steel 16-15-6, Fe-16Cr-15Ni-7.5Mn-6Mo+'), and 'Select Property and Independent Variable'. The third dropdown is open, showing a list of properties and independent variables such as 'Area Reduction (percent): Quench Temperature (F)', 'Area Reduction (percent): Tempering Temperature (F)', 'Creep Rupture Life (h): Creep Rupture Life (h)', etc. A red box highlights the 'Select Property and Independent Variable' dropdown, and a red arrow points to it from the text above. In the top right corner, there is a 'User Options' section with links for 'Applications Menu' and 'Logout'. At the bottom right, the copyright notice '© 2003-2009 CINDAS LLC' is visible.

Step.4 選擇特性/獨立變異數後，可選擇以圖表或是文字方式呈現結果

This screenshot shows the same website interface as the previous one, but with the 'Select Property and Independent Variable' dropdown menu now set to 'Area Reduction (percent): Quench Temperature (F)'. Below this dropdown, there are two buttons: 'Show Graph' and 'Show Text'. A red box highlights these two buttons. The rest of the interface, including the material selection dropdowns and the top navigation, remains the same.

Browse by Property Group (瀏覽特性群組)

Step.1 選擇所需的特性群組

The screenshot shows a close-up of the 'Property Group' dropdown menu. The menu is titled 'Property Group (Help)' and currently displays 'Other Properties - Temperatures'. A small downward arrow is visible on the right side of the dropdown box.

Step.2 選擇特性群組後，會出現 Select Property Name 選單，幫助使用者取得精確的特性名稱

This screenshot shows the CINDAS LLC website interface after selecting a property group. The 'Select Property Group' dropdown is set to 'Other Properties - Temperatures'. Below it, the 'Select Property Name' dropdown is open, showing a list of 18 properties. A red box highlights the 'Select Property Name' dropdown, and a red arrow points to it from the text above. The rest of the interface, including the material selection dropdowns and the top navigation, remains the same.

Step.3 選擇特性名稱後，會列出該特性的範圍，使用者勾選獨立變異數後，可選擇以圖表或文字方式呈現結果

CINDAS LLC

[CINDAS > Applications > ASDM \(version 2.0, data updated 2009.1\) >](#)

ASDM (version 2.0, data updated 2009.1) [Material Cross Index](#) | [PDF](#) | [PDF Help](#)

Select Property Group: Other Properties - Temperatures (20 property groups)

Select Property Name: Temperature (18 properties)

Property Range
Temperature (F) 199.27 - 4318.3

Select an Independent Variable, and then click the Show Graph or Show Text button.

Independent Variable	Minimum	Maximum
<input type="radio"/> HfC Content (percent)	0.004700838043	1.49
<input type="radio"/> Hot-Cold Reduction (percent)	50.04	93.78
<input type="radio"/> Time (h)	0.72	96.96
<input type="radio"/> Time in min (min)	0.01	10000.0

[Show Graph](#) [Show Text](#)

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Search(檢索)功能

■ Search by Material Name (檢索材料)

Step.1 輸入材料關鍵字 (以鎳 nickel 為例) 按下 Go

Search By:
Material Name

[Go](#)

e.g., ni inco, Nickel Incoloy

Step.2 輸入材料關鍵字後，會出現 Select Material Name 選單，幫助使用者取得精確的材料名稱

CINDAS LLC

[CINDAS > Applications > ASDM \(version 2.0, data updated 2009.1\) >](#)

ASDM (version 2.0, data updated 2009.1) [Material Cross Index](#) | [PDF](#) | [PDF Help](#)

Search By Material Name:

Select Material Name: (54 materials)

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Step.3 選擇材料名稱後，會出現 Select Property (特性) and Independent Variable (獨立變異數) 選單

CINDAS LLC

CINDAS > Applications > ASMD (version 2.0, data updated 2009.1) >

ASMD (version 2.0, data updated 2009.1)

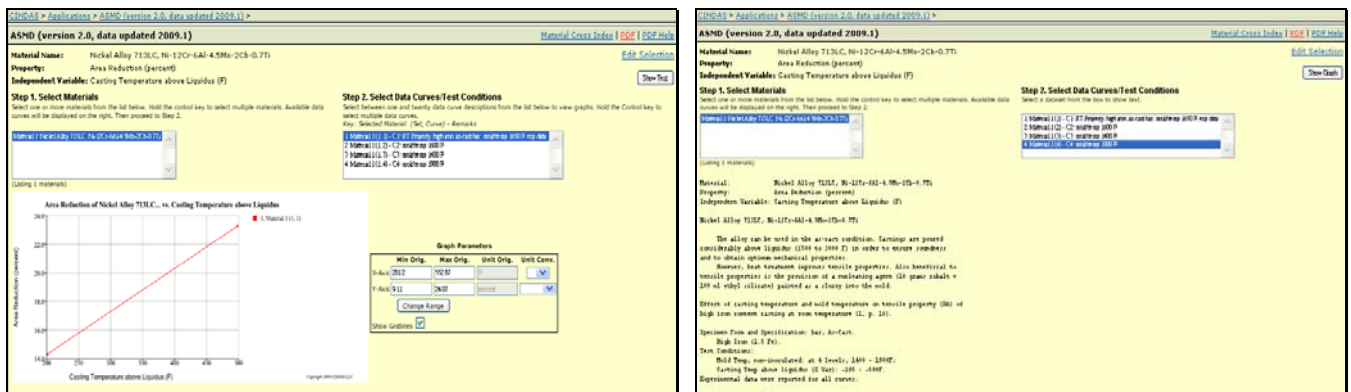
Search By Material Name:

Select Material Name: (54 materials)

Select Property and Independent Variable: (62 property/independent variable)

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Step.4 選擇特性/獨立變異數後，可選擇以圖表或是文字方式呈現結果



圖表呈現

文字呈現

■ Search by Property Name (檢索特性)

Step.1 輸入特性關鍵字，以溫度(temperature)為例，按下 Go

Property Name

Go

e.g., electric, Electric Resistivity

Step.2 輸入特性關鍵字後，會出現 Select Property Name 選單，幫助使用者取得精確的特性名稱

CINDAS LLC

CINDAS > Applications > ASMD (version 2.0, data updated 2009.1) >

ASMD (version 2.0, data updated 2009.1)

Search By Property:

Select Property Name:

Aging Temperature

Annealing Temperature

Curie Temperature

Ductile to Brittle Transition Temperature, DBTT

Ductility Transition Temperature

Exposure Temperature

Fracture Appearance Transition Temperature

Heat-Treatment Temperature

Nil-Ductility Transition Temperature

Peak Temperature

Preheat Temperature

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The screenshot displays the CINDAS LLC ASMDS (version 2.0) web application. The interface includes a header with the CINDAS LLC logo and a 'User Options' menu. The main content area shows the search results for 'ASMDS (version 2.0, data updated 2009.1)'. The search criteria are: 'Search By Property: temperature', 'Select Property Name: Heat-Treatment Temperature (17 properties)', and 'Property Range: Heat-Treatment Temperature (F) 1341.42 - 1595.14'. The 'Independent Variable' is set to 'Time (h)' with a range of 0.1 to 9036.28. Red arrows point to the search criteria and the independent variable selection.

User Options
[Applications Menu](#)
[Logout](#)

CINDAS > [Applications](#) > [ASMDS \(version 2.0, data updated 2009.1\)](#) >

ASMDS (version 2.0, data updated 2009.1) [Material Cross Index](#) | [PDF](#) | [PDF Help](#)

Search By Property:

Select Property Name: (17 properties)

Property Range
Heat-Treatment Temperature (F) 1341.42 - 1595.14

Select an Independent Variable, and then click the Show Graph or Show Text button.

Independent Variable Minimum Maximum

☒ Time (h) 0.1 9036.28

[Show Graph](#) [Show Text](#)

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The figure displays two software interfaces side-by-side, comparing ASME (version 2.0, data updated 2009.1) on the left and ASM (version 2.0, data updated 2009.1) on the right. Both interfaces are used for material selection and data curve input.

ASME Interface (Left):

- Header:** ASME (version 2.0, data updated 2009.1)
- Property:** Heat-Treatment Temperature (F)
- Independent Variable:** Time (h)
- Step 1. Select Materials:** Select one or more materials from the list below. Hold the control key to select multiple materials. Available data curves will be displayed on the right. Then proceed to Step 2.
- Material List:** A dropdown menu showing "Stainless Steel Types 301 and 302, P-100-100".
- Step 2. Select Data Curve/Test Conditions:** Select between one and twenty data curve descriptions from the list below to view graphs. Hold the Control key to select multiple data curves.
- Data Curve List:** A dropdown menu showing "Method 1 (1) - C1: Upper limit of weld groove width", "Method 1 (1) - C2: Types limit of polyethylene acid", and "Method 1 (1) - C3: Surface finish preparation".
- Graph:** A line graph titled "Heat-Treatment Temperature of Stainless Steel Types 301 and 302, vs. Time". The Y-axis is "Heat-Treatment Temperature (F)" ranging from 1,300,000 to 1,600,000. The X-axis is "Time (h)" ranging from 0 to 10,000. A single data curve is plotted, showing a sharp initial drop in temperature followed by a gradual decrease.
- Graph Parameters Table:**

Min Orig.	Max Orig.	Unit Orig.	Unit Conv.
X-Axis: 0.1	1025.49	h	h
Y-Axis: 100.5	1595.14	F	F

ASM Interface (Right):

- Header:** ASM (version 2.0, data updated 2009.1)
- Property:** Heat-Treatment Temperature (F)
- Independent Variable:** Time (h)
- Step 1. Select Materials:** Select one or more materials from the list below. Hold the control key to select multiple materials. Available data curves will be displayed on the right. Then proceed to Step 2.
- Material List:** A dropdown menu showing "Stainless Steel Types 301 and 302, P-100-100".
- Step 2. Select Data Curve/Test Conditions:** Select a dataset from the box to show text.
- Data Curve List:** A dropdown menu showing "Method 1 (1) - C1: Upper limit of weld groove width", "Method 1 (1) - C2: Types limit of polyethylene acid", and "Method 1 (1) - C3: Surface finish preparation".
- Graph:** A line graph titled "Heat-Treatment Temperature of Stainless Steel Types 301 and 302, vs. Time". The Y-axis is "Heat-Treatment Temperature (F)" ranging from 1,300,000 to 1,600,000. The X-axis is "Time (h)" ranging from 0 to 10,000. A single data curve is plotted, showing a sharp initial drop in temperature followed by a gradual decrease.
- Graph Parameters Table:**

Min Orig.	Max Orig.	Unit Orig.	Unit Conv.
X-Axis: 0.1	1025.49	h	h
Y-Axis: 100.5	1595.14	F	F

■ 圖表方式呈現

選擇符合特性/獨立變異數的材料。如有多個材料符合，使用者可單選亦可按住 ctrl 鍵複選。

選擇完材料名稱後，使用者可選擇欲查看的資料曲線/測試狀況。如欲查看多條曲線，請按住 ctrl 鍵複選。【請注意，每種材料有其對應的曲線，使用者選擇時請注意，如材料選擇 Material 1；曲線圖需選擇以 Material 1 開頭的項目】

CINDAS LLC

CINDAS > Applications > ASMD (version 2.0, data updated 2009.1) >

ASMD (version 2.0, data updated 2009.1)

Property Group: Other Properties - Temperatures
Property: Temperature (F)
Independent Variable: Time in min (min)

Step 1. Select Materials
Select one or more materials from the list below. Hold the control key to select multiple materials. Available data curves will be displayed on the right. Then proceed to Step 2.

Material 1: High Strength Steel AerMet 100, Fe-3.1Cr-11.5Ni-13.5Co+..
Material 2: Molybdenum, Commercially Pure, Mo

(Listing 2 materials)

Step 2. Select Data Curves/Test Conditions
Select between one and twenty data curve descriptions from the list below to view graphs. Hold the Control key to select multiple data curves.
Key: Selected Material: (Set, Curve) - Remarks

6. Material 1 (1, 6) - C6: Ms=225 C (437 F)
7. Material 1 (1, 7) - C7: Bs
8. Material 1 (2, 1) - cooling curve, cooled in VC after ST 1600 F
9. Material 2 (1, 1) - C1: PM sheet (95% deformation), onset of recrystallization, sm cv
10. Material 2 (1, 2) - C2: completion of recrystallization

Temperature of 2 Materials vs. Time in min

Graph Parameters

	Min Orig.	Max Orig.	Unit Orig.	Unit Conv.
X-Axis	0.01	1382.0	min	
Y-Axis	195.63	1602.9	F	

Change Range
Show Gridlines ☒

重新選擇

圖表轉文字

曲線控制框

顯示圖表格線

文字方式呈現

CINDAS LLC

CINDAS > Applications > ASMD (version 2.0, data updated 2009.1) >

ASMD (version 2.0, data updated 2009.1)

Property Group: Other Properties - Temperatures
Property: Temperature (F)
Independent Variable: Time in min (min)

Step 1. Select Materials
Select one or more materials from the list below. Hold the control key to select multiple materials. Available data curves will be displayed on the right. Then proceed to Step 2.

Material 1: High Strength Steel AerMet 100, Fe-3.1Cr-11.5Ni-13.5Co+..
Material 2: Molybdenum, Commercially Pure, Mo

(Listing 2 materials)

Step 2. Select Data Curves/Test Conditions
Select a dataset from the box to show text.

3. Material 1 (3) - C3: finish hardness, Rc = 53
4. Material 1 (4) - C4: finish hardness, Rc = 52 (1)
5. Material 1 (5) - C5: finish hardness, Rc = 52 (2)
6. Material 1 (6) - C6: Ms=225 C (437 F)
7. Material 1 (7) - C7: Bs

Material: High Strength Steel AerMet 100, Fe-3.1Cr-11.5Ni-13.5Co+..
Property: Temperature (F)
Independent Variable: Time in min (min)

High Strength Steel AerMet 100, Fe-3.1Cr-11.5Ni-13.5Co-1.2Mo-0.23C

Melting Range:
Heating - solidus, 2614 F; liquidus, 2729 F. Cooling - solidus, 2633 F.
Transformation temperatures - Ac1 = 1065 F; Ac3 = 1525 F (Ref 11).

Continuous cooling curves from solution treatment at 1625 F.

Ms - Martensite start (1 percent transformation).

將數據以文字方式呈現

重新選擇

文字轉圖表

Material Cross Index(材料名稱對照索引)

按下 Material Cross Index (材料名稱對照索引)，可獲得材料名稱對照索引，有助於使用者查詢對應的材料名稱

ASMD (version 2.0, data updated 2009.1)

Material Cross Index | PDF | PDF Help

A		B
1	Material Name	Commercial and Alternated Designations
2	Carbon Steel T-1, Fe-0.15C-0.8Mn-0.85Ni-0.53Cr-0.50Mo+..	T-1, T-1 Type A, T-1 Type B, USS T-1, USS T-1 Type A, USS T-1 Type B
3	High Strength Steel 4130, Fe-0.30C-0.95Cr-0.20Mo	4130, AISI 4130, SAE 4130, 4130H, UNS G41300, UNS H41300
4	High Strength Steel 4140, Fe-0.4C-1.0Cr-0.2Mo	4140, AISI 4140, SAE 4140, 4140H, UNS G41400, UNS J14046
5	High Strength Steel 4330V, Fe-0.3C-1.8Ni-0.8Cr+..	4330V, 4330, 4330 Mod, 4330V Mod, 4330V (Mod+Si), UNS J23260, UNS K23080
6	High Strength Steel 4335V Mod, Fe-0.35C-1.8Ni+..	4335 V Modified, 4335 Modified, UNS Number K33517
7	High Strength Steel 4340 (4337), Fe-0.4C-1.8Ni+..	4340, AISI 4340, SAE 4340, E 4340, 4340 H, UNS G43400
8	High Strength Steel 52100, Fe-1.0C-1.45Cr	52100, E 52100, Teton (Allegheny-Ludlum)
9	High Strength Steel 8630, Fe-0.3C-0.55Ni-0.5Cr-0.25Mo	8630, AISI 8630, SAE 8630, 8630H, UNS J13042, UNS J13050, UNS G86300
10	High Strength Steel E9310, Fe-0.1C-3.25Ni-1.2Cr-0.1Mo	E9310, SAE 9310, AISI E 9310 H, AMS 6260 E, UNS G93106
11	High Strength Steel 17-22A(S), 17-22A(V), Fe-C-1.3Cr+..	17-22A(S), 17-22(V), Uniloy 14 MV (Universal Cyclops designation for 17-22A(S))
12	High Strength Steel D6A, D6AC, Fe-0.46C-1.0Cr-1.0Mo-0.55Ni	D6A(air melt), D6AC, UNS K24728, UNS K24729
13	High Strength Steel Hy-Tuf, Fe-0.25C-1.8Ni-1.5Si-1.3Mn-0.4Mo	Hy-Tuf, UNS K32550
14	High Strength Steel Nitralloy 135 Mod, Fe-0.4C-1.6Cr-1.1Al+..	Nitralloy 135 modified, Nitralloy Type G modified, AMS 6470 Nitriding Steel, SAE 7140, UNS K24065

*Material Name：資料庫提供的材料名稱(簡易寫法)

*Commercial and Alternated Designations：業界使用；可與資料庫材料名稱對應/替換的材料名稱

PDF 資訊

使用者點選 PDF 的連結以取得更多資訊，PDF 提供的資訊有：

- [Alloy Groups](#)：CINDAS 委託專家學者為 ASMD 收錄的各種材料所撰寫的文獻
- [General Discussion](#)：合金介紹、分類、資料內容包含有各種材料名稱、特性、組成成分、溫度、硬度、外形及狀況、熔點及鑄造慣例、物理特性及環境變數、機械特性及構造等。
- [Cross Index](#)：材料名稱對照索引
- [Abbreviations](#)：提供材料的縮寫、專有名詞對照
- [Fracture Properties](#)：破裂特性
- [SI Conversion Factors and Tables](#)：International System of Units (國際單位制，簡稱 SI)轉換係數與列表

Step.1 點擊 PDF

ASMD (version 2.0, data updated 2009.1)

[Material Cross Index](#) | PDF | [PDF Help](#)

AEROSPACE STRUCTURAL METALS DATABASE

Click on desired alloy group or desired topic.

General Discussion
Abbreviations
Cross Index
Fracture Properties
SI Conversion Factors and Tables

Alloy Groups

Ultra-High Strength and Age Hardening Steels
Stainless and Other Steels
Aluminum Alloys
Magnesium Alloys
Titanium Alloys
Nickel Alloys
Other Alloys

Step.2

點選名稱以獲得 PDF 全文